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# The Washington Times

## Stroll across solar system

### Scale model on Mall places sun, planets

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**Illustration:** Photos (color), A&B) Jeff Goldstein (right) of Challenger Center for Space Science Education discusses the **solar system** with sixth-graders from Forest Heights Elementary School at the sun emplacement in the outdoor exhibit "Voyage - A Journey Through Our **Solar System**" on the Mall. Markers in the permanent exhibit (above) show the relative distances between planets., Both By Ross D. Franklin/The Washington Times

Photos, C&D) Sixth-graders from Forest Heights Elementary School in Prince George's County learn about the **solar system** in the Mall's new permanent outdoor exhibit, "Voyage: A Journey Through Our **Solar System**" (above). At right, a pale moon looms over "Ad Astra," a separate sculpture at the Air and Space Museum. The map (below) can help one keep from crashing into the sun., Both By Ross D. Franklin/The Washington Times

Map; Box, Map Caption) THE "VOYAGE" EXHIBIT; Box Caption) **SOLAR SYSTEM SNIPPETS**, Map) By The Washington Times; Box) NO CREDIT

Not long ago, humans thought Earth was in the center of the universe and Saturn was the most remote planet. Now we know not only the order of the planets, but the exact distances between them.

"It's 93 million miles between the sun and Earth," says Jeff Goldstein, vice president of space science research at the Challenger Center for Space Science Education, located in Alexandria. The center is a nonprofit educational organization created in 1986 by the families of the astronauts lost during the last flight of the Challenger space shuttle.

"But that doesn't really tell us much. . . . It's too difficult to comprehend that distance," Mr. Goldstein says.

Giving a clearer picture of the relation and distances between the planets, the sun, moons, asteroids and comets was one of the goals for Mr. Goldstein and representatives from the National Aeronautics and Space Administration and the Smithsonian Institution when they developed "Voyage - A Journey Through Our **Solar System**," an outdoor exhibit on the Mall completed this fall.

The permanent exhibit, which consists of about a dozen 8 1/2-foot stainless-steel stations each representing a planet, star or asteroids and comets in our **solar system**, stretches along the sidewalk between the National Air and Space Museum and the Smithsonian's administration building, the Castle, next to Jefferson Avenue.

Everything in the exhibit is one-ten-billionth its real size.

"That places the Earth just a few steps from the sun," Mr. Goldstein says.

To be precise, that scale places Earth 23 steps from the sun, which in the exhibit is the size of a grapefruit (5.5 inches in diameter) while Earth is like the tip of ballpoint pen.

To get the precise distance between planets, astronomers send a radar pulse from Earth to, for example, Venus. They measure the time it takes for the pulse to make the round trip and then multiply that time by the speed of light. That gives the distance, Mr. Goldstein says.

\* n n

On a recent November morning, Mr. Goldstein and Jean-Marc Perelmuter, also an astrophysicist from the Challenger Center for Space Science Education, took a class of sixth-graders from Forest Heights Elementary School in Prince George's County on a tour of the exhibit.

"This is a way to see the **solar system** without leaving your home, Earth," Mr. Perelmuter said.

The children, bundled in winter clothes, all nodded.

While standing in front of the sun station, surrounded by about 20 children, Mr. Goldstein said 1 million Earths can fit in the sun.

"Wow," the children responded in unison.

"What makes the sun so big compared to other stars?" Mr. Goldstein asked. "Is it because it really is bigger, or is because it's closer to the Earth?"

The children agreed that the sun is just one among many stars and that the reason it seems so big to us is that it's close by.

"Do you know where the next-closest star is if we use this scale?" Mr. Goldstein asked. "California."

Another set of "wows" came out of the crowd.

While talking about the sun, Mr. Goldstein said there are at least 80 stars that, like the sun, have their own "families" and that we don't know yet if there is life anywhere else.

"We're discovering a [new] **solar system** per month," Mr. Goldstein told the students.

While pointing in the direction of the Smithsonian's administration building, where the Pluto station is located, Mr. Goldstein said the spacecraft Voyager One is now beyond Pluto, all the way to the Lincoln Memorial.

The spacecraft may be able to help answer questions about life on other planets, but even if it's traveling at the breakneck speed of 40,000 miles an hour, it may not be able to reveal anything in our lifetime.

"Even at 40,000 miles an hour, it will take Voyager about 80,000 years to reach the next star," he said.

One of the sixth-graders, 11-year old DeAngelo Green, who like the other children knows the order of the planets, had a pressing question after the tour was over.

"I want to know if there is life anywhere," he said.

Mr. Goldstein said there is no answer to that yet but that he hoped the exhibit would inspire the children to explore and study on their own. He might be in luck with DeAngelo, who said he's planning a future in space.

"I want to go to space and be a lawyer," he said.

\* \* \*

The entire exhibit, designed by the Brooklyn-based design firm Vincent Ciulla Design, spans about 650 yards, which means a visitor can experience the whole **solar system** in a 10-minute walk. Each station provides statistics about each planet and shows the distances between different planets and the sun.

Along with the exhibit there is a printed guide that visitors can pick up at the National Air and Space Museum or download at [www.voyageonline.org](http://www.voyageonline.org).

The guide asks questions about the outdoor exhibit, some of which can be answered only if the visitor goes to one of several of the museums on the Mall.

For example, when it comes to Venus, the guide connects the visitor to the National Air and Space Museum by asking if the visitor can find a 15-foot color mosaic of Venus in the "Exploring the Planets" exhibit in the museum.

Another exhibit that is connected to "Voyage" is the new "Explore the Universe" exhibit, a historical look at how humans have studied space through the ages.

The outdoor exhibit also can tell us more about what we see in the fall sky, one of the best times for stargazing.

"Right now you can see Mars in the western sky just after the sun sets," says Ron Harvey Jr., a Rock Creek Park ranger and recent director of the Rock Creek Park Planetarium.

"You should also be able to see Saturn a few hours after sunset, and then you can see Jupiter a couple of hours after that," he says. Saturn and Jupiter will be 180 degrees from the spot where the sun sets, he says.

Venus, known as the "morning star," is visible in the early morning.

One way to differentiate between stars and planets is that planets don't twinkle the way stars do.

While humans have answered many space-related questions in the past few hundreds of years, many remain, says Mr. Goldstein, who is reluctant to point to any specific question as being more important to solve than others.

How do you choose between resolving whether there is life on Mars and why Saturn has such well-defined rings? he asks rhetorically.

With so many unanswered questions, it seems that the permanent exhibit may have to be altered, depending on what new facts are found. Mr. Goldstein isn't worried.

"This exhibit is grounded in fundamental scientific fact," he says, "and it should certainly last at least 10 years," an eternity when it comes to current space research.

\*\*\*BOX

## **SOLAR SYSTEM SNIPPETS**

\*Our **solar system** includes the sun, nine planets - Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune and Pluto - and dozens of moons.

- \* It takes the sun's rays eight minutes to reach the Earth; it takes them six hours to reach Pluto, the most remote planet in the **solar system**.
- \* The surface temperature of the sun can reach 11,000 degrees Fahrenheit, which is hot enough to vaporize anything.
- \* Venus was once called Earth's twin, but it is far different from what we imagined, with searing heat that quickly cooks anything that ventures onto it.
- \* Spacecraft have landed on Venus, but none has lasted more than two hours on the sizzling surface. The temperature of Venus is about 880 degrees Fahrenheit.
- \* The **solar system** may contain up to a trillion comets.
- \* Jupiter has 18 moons, of which one, Europa, has an icy surface that might contain life.

Source: "Voyage - A Journey Through Our **Solar System**"

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